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09/770,544	01/26/2001	Youngjune L. Gwon	10745/8	6793

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Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610

EXAMINER	
NG, CHRISTINE Y	
ART UNIT	**PAPER NUMBER**
2663	3

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/770,544	Applicant(s) GWON, YOUNGJUNE L.	
	Examiner Christine Ng	Art Unit 2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 January 2001.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-6 and 8-19 is/are rejected.

7)☒ Claim(s) 7 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 26 January 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 6 is objected to because of the following informalities:

Claim 6 cannot be dependent on itself.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1, 3, 5, 10, 11, 13 and 17 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 6,052,598 to Rudrapatna et al.

Referring to claim 1, Rudrapatna et al disclose in Figure 1 a method for predicting mobility of a mobile node (MU) relative to one or more fixed nodes (bsM, bsi_1, bsi_2) in a wireless, mobile access, digital network. Refer to Column 3, lines 12-33. As shown in Figure 2, the method comprises:

Obtaining (Step S2) a plurality of samples of a first physical parameter (signal strength), the value of which is related to the mobility of the mobile node (MU). At step S2, the network computes at least two instantaneous signal strengths "between the mobile unit MU and the base station bsM and the signal strengths between the mobile station MU and the base stations in neighboring cells including bsi_1, bsi_2" (Column 3, lines 52-57). Refer to Column 4, lines 24-27.

Statistically processing (Step S3) the plurality of samples and generating a predicted future value of the parameter (signal strength). At step S3, the MSC "projects what the signal strength between the mobile unit MU and the base stations of the current cell and the neighboring cells will be at time in the future based on the actual measurements up to the current time" (Column 4, lines 4-14).

Referring to claim 3, Rudrapatna et al disclose in Figure 2 that the step of obtaining (Step S2) a plurality of samples comprises deterministically obtaining the samples from samples of a second related physical parameter (cell size or speed of mobile). "Signal strength measurements can be made on a periodic basis which may be a function of the cell size or an expected maximum speed or average speed of a mobile in the current cell" (Column 4, lines 29-32).

Referring to claim 5, Rudrapatna et al disclose in Figure 2 that the step of obtaining (Step S2) a plurality of samples comprises measuring the samples. The network performs signal strength measurements. Refer to Column 3, lines 51-57 and lines 65-66.

Referring to claim 10, Rudrapatna et al discloses in Figure 2 that the first physical parameter (signal strength) is a stochastic process. Rudrapatna et al discloses that the signal strength measurements are taken on a periodic basis, which may be a function of such variables as cell size or an expected maximum speed or average speed of the mobile in the current cell. Refer to Column 4, lines 29-32. The periodic interval may also be determined in real time and based on variables such as maximum estimated or average velocity of the mobile unit and network traffic. Refer to Column 4, lines 38-41.

Referring to claim 11, Rudrapatna et al disclose in Figure 2 that the step of statistically processing (Step S3) comprises a stochastic prediction process. The prediction of the future signal strength is made by extrapolation. At step S3, the MSC "projects what the signal strength between the mobile unit MU and the base stations of the current cell and the neighboring cells will be at time in the future based on the actual measurements up to the current time" (Column 4, lines 7-11). The extrapolation process uses the standard curve fitting techniques and is also based on an appropriate propagation model within each cell. Refer to Column 4, lines 11-16.

Referring to claim 13, Rudrapatna et al discloses in Figure 2 that the step of statistically processing (Step S3) comprises an adaptive prediction process. The prediction of the future signal strength is made by extrapolation. At step S3, the MSC "projects what the signal strength between the mobile unit MU and the base stations of the current cell and the neighboring cells will be at time in the future based on the actual measurements up to the current time" (Column 4, lines 7-11). The measurements used for extrapolation are taken from the signal strength measurements. The number of signal strength measurements can adaptively change depending on the characteristics of the cell and mobile unit, such as cell size and mobile unit speed. Refer to Column 4, lines 24-41.

Referring to claim 17, Rudrapatna et al disclose in Figure 2 that the method includes:

Comparing (Step S4) the predicted future value with a predetermined threshold value (Th_O). Refer to Column 4, lines 42-45.

Initiating a desired action (Step S5) when the predicted future value meets or exceeds the threshold value (Th_O). If the predicted future signal strength is greater than Th_O, then the process goes back to step S2; else, the predicted future value is compared to another threshold Th_I. Refer to Column 4, line 57 to Column 5, line 4.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2, 4, 6 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,052,598 to Rudrapatna et al in view of U.S. Publication No. 2001/0036834 to Das et al.

Referring to claims 2 and 6, Rudrapatna et al does not disclose that the first physical parameter is packet latency.

Das et al disclose that packet latency is a value that is related to the mobility of a mobile node. When a mobile node changes from one subnet to another, it must perform a location update during which the mobile node must obtain a new care-of address from the new subnet and communicate the new address to its home agent. The "location update can take a long time thereby introducing a large update latency in the location update process". Refer to Paragraphs 0005, 0008 and 0010. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the first physical parameter is packet latency; the motivation being

the packet latency is an important parameter in the mobility management of a mobile node. During a handoff, a mobile node must be able to minimize latency and quickly change from a home agent to a foreign agent in order to prevent loss of information.

Referring to claim 4, Rudrapatna et al does not disclose that the first physical parameter is packet latency and the second physical parameter is transmitter to receiver distance.

Das discloses that the first physical parameter is packet latency. Refer to the rejection of claims 2 and 6. Rudrapatna et al does not specifically disclose that the second physical parameter is transmitter to receiver distance. However, Rudrapatna et al discloses that the distance between a mobile station and a base station determines the strength of a signal for handoff purposes. As MU moves towards base stations bsi_1 and bsi_2, the signal strength increases; as MU moves away from base station bsM, the signal strength decreases. Refer to Column 3, lines 26-34. MU is thus handed off to either base station bsi_1 or bsi_2. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the second physical parameter is transmitter to receiver distance; the motivation being that as a mobile station moves away from a base station, its signal strength decreases so the mobile station must be handed off to another base station with a higher signal strength; thereby allowing the mobile station to maintain communication as it crosses cell boundaries.

Referring to claim 19, Rudrapatna et al disclose that a future value of the first physical parameter (signal strength) is predicted with respect to each of a plurality of

fixed nodes (bsM, bsi_1, bsi_2) in a network. The network computes signal strengths "between the mobile unit MU and the base station bsM and the signal strengths between the mobile station MY and the base stations in neighboring cells including bsi_1, bsi_2" (Column 3, lines 52-57). Rudrapatna et al also disclose that a network connection is established between the mobile node (MU) and the fixed node (bsM, bsi_1, bsi_2) exhibiting the highest projected signal strength. Refer to Column 5, lines 15-20.

Rudrapatna et al does not disclose that the first physical parameter is packet latency and that the network connection is established between the mobile node and the fixed node exhibiting the lowest predicted value of packet latency. Refer to the rejection of claims 2 and 6. In addition, it would also have been obvious to one of ordinary skill in the art at the time the invention was made to include that the network connection is established between the mobile node and the fixed node exhibiting the lowest predicted value of packet latency; the motivation being that a low packet latency can minimize packet loss as a mobile node is handed off from one subnet to another. Refer to Paragraphs 0005, 0008, 0010 and 0011.

6. Claims 8, 9, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,052,598 to Rudrapatna et al in view of U.S. Patent No. 6,115,406 to Mesecher, and in further view of U.S. Publication No. 2002/0093908 to Yeap.

Referring to claims 8, 9 and 16, Rudrapatna et al does not disclose that the step of statistically processing comprises application of a least mean squares algorithm and an algorithm to minimize mean square error.

Mesecher discloses in Figure 5 a step of statistically processing a plurality of pilot signals from various rake receivers 82- 86, which comprises application of a least mean squares algorithm. Using the least mean squared algorithm, the weights 88-92 are adjusted to minimize error of the combined signal from all rake receivers 82-86 in order to maximize the signal quality of the combined signal. Refer to Column 3, line 52 to Column 4, line 5. Furthermore, Yeap discloses that least mean square algorithm provides a way to minimize the mean-square error a desired signal and a received signal and reduces system complexity. The least mean square algorithm "seeks out the minimum point of the error-performance surface by calculating a series of error gradients". Refer to Paragraph 0050-0051. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the step of statistically processing comprises application of a least mean squares algorithm; the motivation being that the least mean square algorithm provides a way to minimize the mean-square error between a desired signal and a received signal and reduces system complexity; thereby achieving better signal quality.

Referring to claim 12, Rudrapatna et al do not disclose that the prediction process comprises inputting the sample values of a first physical parameter to a correlation computer and generating an estimation; and inputting the estimation coefficient and the sample values to a linear combiner and generating a minimized mean square error predicted value of the first physical parameter at a future time.

Mesecher discloses in Figure 5 that a prediction process comprises inputting the sample values from a first physical parameter (pilot signal) to a correlation computer

(rake receivers 82-86 and weighting devices 88-92) and generating an estimation coefficient (weighted pilot signal). Each vector correlator 82-86 is used to despread each pilot signal using a replica of the corresponding pilot signal's PN code sequence, which is then sent to the weighting devices 88-92. Refer to Column 3, lines 52-64. The process also comprises inputting the estimation coefficient (weighted pilot signal) and the sample values to a linear combiner (Element 94) and generating a minimized mean square error predicted value (from Element 96) of the first physical parameter (pilot signal) at a future time. The weighted pilot signals are sent to the combiner 94 and used to create an error signal. The error signal is used to adjust the weights of the weighting devices 88-92 to minimize the error signal using the least mean squares algorithm. Refer to Column 3, line 64 to Column 4, line 5. Yeap et al disclose that the least means square algorithm minimizes mean square error. Refer to the rejection of claims 8, 9 and 16. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the prediction process comprises inputting the sample values of a first physical parameter to a correlation computer and generating an estimation; and inputting the estimation coefficient and the sample values to a linear combiner and generating a minimized mean square error predicted value of the first physical parameter at a future time; the motivation being that this method minimizes the error between the predicted signal and the desired signal, thereby maximizing signal quality.

7. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,052,598 to Rudrapatna et al in view of U.S. Patent No. 6,370,133 to Kang et al.

Referring to claim 14, Rudrapatna et al disclose that the adaptive prediction process comprises inputting the sample values of the first physical parameter (signal strength) to an adaptive predictor (MSC) and generating a predicted value of the first physical parameter (signal strength) at a selected time in the future. The MSC uses extrapolation to determine the future signal strength of a cell based on past measurements of the signal strength. Refer to Column 4, lines 4-16. Rudrapatna et al does not disclose: obtaining the actual value of the first physical parameter at the selected time; comparing the predicted value and the actual value and generating an error value; and feeding back the error value to the adaptive predictor and adjusting the predicted value of the first physical parameter at a next selected time in the future.

Kang et al disclose in Figure 5 obtaining the actual value (actual AMPS component) of the first physical parameter at the selected time; comparing the predicted value (predicted AMPS component) and the actual value (actual AMPS component) and generating an error value (at weight update circuit 272d); and feeding back the error value to the adaptive predictor (predictor 272b) and adjusting the predicted value (predicted AMPS component) of the first physical parameter at a next selected time in the future. The predictor 272b functions to minimize the error between the actual AMPS component and the predicted AMPS component during the next sample period so that it is "constantly updated with the most recent comparison to accurately predict the next

occurring word sample". Refer to Column 8, lines 31-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include obtaining the actual value of the first physical parameter at the selected time; comparing the predicted value and the actual value and generating an error value; and feeding back the error value to the adaptive predictor and adjusting the predicted value of the first physical parameter at a next selected time in the future; the motivation being so that the adaptive comparator can be provided with the most recent and accurate comparison between the actual measurement and the predicted measurement; thereby minimizing the error between the two measurements during the next prediction cycle.

Referring to claim 15, Rudrapatna et al disclose in Figure 2 (Step S8) that the sample values are iteratively input to the adaptive predictor (MSC) and wherein the adaptive predictor (MSC) iteratively predicts values of the first physical parameter (signal strength) at successive selected times in the future (after handover). The MSC uses extrapolation to determine the future signal strength of a cell based on past measurements of the signal strength. Refer to Column 4, lines 4-16. After handover has occurred, control returns at step S8 to iteratively repeat the process again. Refer to Column 5, lines 39-44.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,052,598 to Rudrapatna et al in view of U.S. Patent No. 6,307,849 to Tiedemann, Jr. Rudrapatna et al do not disclose that the first physical parameter is selected from the group comprising: signal to interference ratio, signal to noise ratio, pilot strength signal.

However, Rudrapatna et al disclose that the first physical parameter is signal strength, which is measured to determine which cell a mobile node should be handed off to. Tiedemann, Jr. discloses in Figure 2 that during a soft handoff, the pilot strength signal from several cells (Cell 12, 14 and 16) are measured to determine which is the strongest, so that the mobile node can switch to from a fading pilot signal to a stronger pilot signal as it crosses cell boundaries. Refer to Column 5, line 66 to Column 6, line 54. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the first physical parameter is pilot strength signal; the motivation being that the pilot strength signal is continuously transmitted to a mobile node from all current and neighboring base stations, so when the mobile node is crossing cell boundaries, it will be able to change to another base station which has a stronger pilot signal, thereby allowing the user to maintain the communication without loss of information.

Allowable Subject Matter

9. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (703) 305-8395. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nguyen Chau can be reached on (703) 308-5340. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Ng cN
June 17, 2004

Chau T. Nguyen

CHAU NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600